

Claims:

1. (currently amended) A mobile communication system comprising:

a multicast router which receives an information signal addressed to a predetermined multicast group transmitted from a transmitter and which ~~can~~ makes a copy of the received information signal and ~~can-distribute~~ distributes it to a network downstream thereof when a mobile terminal belonging to the multicast group is present downstream of the multicast router;

a data link layer switch which receives the information signal distributed from the multicast router and which ~~can-distribute~~ distributes a copy of the received information signal only to a multicast distribution path in which a mobile terminal belonging to the multicast group is present;

a radio base station which is connected to the data link layer switch and which ~~can-distribute~~ distributes the information signal distributed by the data link layer switch to a radio network downstream thereof; and

a mobile terminal which receives the information signal distributed by the radio base station,

the mobile terminal comprising:

station switching detection means which detects that the radio base station connected to the mobile terminal itself has been switched;

router switching detection means which detects that the multicast router connected to the mobile terminal itself has been switched;

establishment request transmission means which transmits a path establishing request for requesting at least the data link layer switch to establish a multicast distribution path for distributing the information signal to the radio base station connected to the mobile terminal itself;

withdrawal request transmission means which transmits a withdrawal request for requesting at least the multicast router to withdraw from the multicast group to which the mobile terminal itself belongs; and

transmission control means which transmits a first instruction signal for instructing the establishment request transmission means to transmit the path

establishing request and a second instruction signal for instructing the withdrawal request transmission means to transmit the withdrawal request, depending on the detection by the station switching detection means, wherein:

when the station switching detection means detects the switching of the radio base station but the router switching detection means does not detect the switching of the multicast router, the transmission control means sequentially outputs the first instruction signal, the second instruction signal, and the first instruction signal again; and

when the station switching detection means detects the switching of the radio base station and the router switching detection means detects the switching of the multicast router, the transmission control means outputs the first instruction signal to transmit the path establishing request to ~~the new~~ a first multicast router which is the multicast router connected to the mobile terminal after the switching the multicast router and thereafter outputs the second instruction signal to transmit the withdrawal request to ~~the previous~~ a second multicast router which is the multicast router connected to the mobile terminal before the switching the multicast router.

2. (original) A mobile communication system according to claim 1, wherein the data link layer switch comprises:

path establishing means which establishes a multicast distribution path in a path according to the path establishing request when the path establishing request is received; and

distribution path reconfiguration means which distributes a presence check request to a network downstream thereof when the presence check request is received and reconfigures the multicast distribution path according to a path establishing request returned in response to the distribution.

3. (currently amended) A mobile terminal belonging to a multicast group and receiving an information signal transmitted on a multicast ~~bases~~ basis through a multicast router, a data link layer switch, and a radio base station, comprising:

station switching detection means which detects that the radio base station connected to the mobile terminal itself has been switched;

router switching detection means which detects that the multicast router connected to the mobile terminal itself has been switched;

establishment request transmission means which transmits a path establishing request for requesting at least the data link layer switch to establish a multicast distribution path for distributing an information signal to the radio base station connected to the mobile terminal itself;

withdrawal request transmission means which transmits a withdrawal request for requesting at least the multicast router to withdraw from the multicast group connected to the mobile terminal itself, to which the mobile terminal belongs; and

transmission control means which transmits a first instruction signal for instructing the establishment request transmission means to transmit the path establishing request and a second instruction signal for instructing the withdrawal request transmission means to transmit the withdrawal request, in response to the, detection by the station switching detection means, wherein:

when the station switching detection means detects the switching of the radio base station but the router switching detection means does not detect the switching of the multicast router, the transmission control means sequentially outputs the first instruction signal, the second instruction signal, and the first instruction signal again; and

when the station switching detection means detects the switching of the radio base station and the router switching detection means detects the switching of the multicast router, the transmission control means outputs the first instruction signal to transmit the path establishing request to ~~the new~~ a first multicast router which is the multicast router connected to the mobile terminal after the switching the multicast router and thereafter outputs the second instruction signal to transmit the withdrawal request to ~~the previous~~ a second multicast router which is the multicast router connected to the mobile terminal before the switching the multicast router.

4. (currently amended) A mobile communication method for a mobile terminal belonging to a multicast group to receive an information signal transmitted on a multicast ~~bases~~basis through a multicast router, a data link layer switch, and a radio base station, the method comprising:

a station switching detection step at which station switching detection means of the mobile terminal detects that the radio base station connected to the mobile terminal itself has been switched;

a router switching detection step at which router switching detection means of the mobile terminal detects that the multicast router connected to the mobile terminal itself has been switched;

a first updating step at which, when the station switching detection means detects the switching of the radio base station but the router switching detection means does not detect the switching of the multicast router, establishment request transmission means of the mobile terminal transmits a path establishing request for requesting the data link layer switch to establish a path for distributing an information signal to the radio base station connected to the mobile terminal itself, at which withdrawal request transmission means of the mobile terminal successively transmits a withdrawal request for requesting the multicast router to withdraw from the multicast group to which the mobile terminal itself belongs, and at which the establishment, request transmission means transmits the path establishing request; and

a second updating step at which, when the station switching detection means detects the switching of the radio base station and the router switching detection means detects the switching of the multicast router, the establishment request means transmits the path establishing request to ~~the new~~a first multicast router which is the multicast router connected to the mobile terminal after the switching the multicast router, and the withdrawal request transmission means transmits the withdrawal request to ~~the previous~~a second multicast router which is the multicast router connected to the mobile terminal before the switching the multicast router.

5. (currently amended) A mobile communication system comprising:

a multicast router which receives an information signal addressed to a predetermined multicast group transmitted from a transmitter and which ~~can make~~makes a copy of the received information signal and ~~can distribute~~distributes it to a network downstream thereof when a mobile terminal belonging to the multicast group is present downstream of the multicast router;

a data link layer switch which receives the information signal distributed by the multicast router and which ~~can distribute~~distributes a copy of the received information signal only to a multicast distribution path in which a mobile terminal belonging to the multicast group is present;

a radio base station which is connected to the data link layer switch and which ~~can distribute~~distributes the information signal distributed by the data link layer switch to a radio network downstream thereof; and

a mobile terminal which receives the information signal distributed by the radio base station,

the mobile terminal comprising:

station switching detection means which detects that the radio base station connected to the mobile terminal itself has been switched;

router switching detection means which detects that the multicast router connected to the mobile terminal itself has been switched;

establishment request transmission means which transmits a path establishing request for requesting at least the data link layer switch to establish a multicast distribution path for distributing the information signal to the radio base station connected to the mobile terminal itself;

withdrawal request transmission means which transmits a withdrawal request for requesting at least the multicast router to withdraw from the multicast group to which the mobile terminal itself belongs; and

transmission control means which transmits a first instruction signal for instructing the establishment request transmission means to transmit the path establishing request and a second instruction signal for instructing the withdrawal request transmission means to transmit the withdrawal request, in response to the

detection by the station switching detection means and the router switching detection means, wherein:

when the station switching detection means detects the switching of the radio base station but the router switching detection means does not detect the switching of the multicast router, the transmission control means sequentially outputs the first instruction signal, the second instruction signal, and the first instruction signal again; and

when the station switching detection means detects the switching of the radio base station and the router switching detection means detects the switching of the multicast router, the transmission control means outputs the first instruction signal to transmit the path establishing request to ~~the new~~ a first multicast router which is the multicast router connected to the mobile terminal after the switching the multicast router and thereafter sequentially outputs the second instruction signal and the first instruction signal to transmit the withdrawal request and the path establishing request to the ~~previous~~ a second multicast router which is the multicast router connected to the mobile terminal before the switching the multicast router.

6. (currently amended) A mobile communication system according to claim 5, wherein the mobile terminal further comprises:

connection strength determination means which determines whether the strength of connection with the radio base station connected to the mobile terminal itself is equal to or higher than a predetermined threshold;

router detection means which detects the presence of the multicast router~~[[s]]~~ connected to ~~the radio base station and a~~ another radio base station adjacent to the radio base station; and

recording means which records information identifying the multicast router which has established a multicast distribution path depending on the establishment request transmission means, wherein:

in cases where the connection strength determination means determines that the strength of connection with the ~~connected~~ radio base station being connected is lower than the predetermined threshold when the router detection means detects the

presence of a multicast router which is not recorded in the recording means, the transmission control means outputs the first instruction signal to the detected-multicast router which has been detected, and records information identifying the detected multicast router which has been detected in the recording means; and

in cases where the connection strength determination means determines that the strength of connection with the ~~connected~~-radio base station being connected has become equal to or higher than the predetermined threshold again after ~~the~~-recording the information identifying the multicast router which has been detected, the transmission control means outputs the second instruction signals to all multicast routers excluding the connected multicast router and deletes information identifying the multicast ~~routers~~-router to which the second instruction signal has been output from the recording means.

7. (currently amended) A mobile terminal belonging to a multicast group and receiving an information signal transmitted on a multicast ~~bases~~-basis through a multicast router, a data link layer switch, and a radio base station, comprising:

station switching detection means which detects that the radio base station connected to the mobile terminal itself has been switched;

router switching detection means which detects that the multicast router connected to the mobile terminal itself has been switched;

establishment request transmission means which transmits a path establishing request for requesting at least the data link layer switch to establish a multicast distribution path for distributing an information signal to the radio base station connected to the mobile terminal itself;

withdrawal request transmission means which transmits a withdrawal request for requesting at least the multicast router to withdraw from the multicast group connected to the mobile station itself, to which the mobile terminal belongs; and

transmission control means which transmits a first instruction signal for instructing the establishment request transmission means to transmit the path establishing request and a second instruction signal for instructing the withdrawal request transmission means to transmit the withdrawal request, in response to the

detection by the station switching detection means and the router switching detection means, wherein:

when the station switching detection means detects the switching of the radio base station but the router switching detection means does not detect the switching of the multicast router, the transmission control means sequentially outputs the first instruction signal, the second instruction signal, and the first instruction signal again; and when the station switching detection means detects the switching of the radio base station and the router switching detection means detects the switching of the multicast router, the transmission control means outputs the first instruction signal to transmit the path establishing request to ~~the new~~ a first multicast router which is the multicast router connected to the mobile terminal after the switching the multicast router and thereafter sequentially outputs the second instruction signal and the first instruction signal to transmit the withdrawal request and the path establishing request to ~~the previous~~ a second multicast router which is the multicast router connected to the mobile terminal before the switching the multicast router.

8. (currently amended) A mobile terminal according to claim 7, further comprising:
connection strength determination means which determines whether the strength of connection with the radio base station connected to the mobile terminal itself is equal to or higher than a predetermined threshold;

router detection means which detects the presence of the multicast router~~[[s]]~~ connected to ~~the radio base station and a~~ another radio base station adjacent to the radio base station; and

recording means which records information identifying the multicast router which has established a multicast distribution path with the establishment request transmission means, wherein:

in cases where the connection strength determination means determines that the strength of connection with the ~~connected~~ radio base station being connected is lower than the predetermined threshold when the router detection means detects the presence of a multicast router which is not recorded in the recording means, the transmission control means outputs the first instruction signal to the ~~detected~~ multicast

router which has been detected, and records information identifying the detected multicast router which has been detected in the recording means; and

in cases where the connection strength determination means determines that the strength of connection with the ~~connected~~-radio base station being connected has become equal to or higher than the predetermined threshold again after ~~the recording~~ the information identifying the multicast router which has been detected, the transmission control means outputs the second instruction signals to all multicast routers excluding the connected multicast router and deletes information identifying the multicast ~~routers~~ router to which the second instruction signal has been output from the recording means.

9. (currently amended) A mobile communication method for a mobile terminal belonging to a multicast group to receive an information signal transmitted on a multicast ~~bases~~ basis through a multicast router, a data link layer switch, and a radio base station, the method comprising:

a station switching detection step at which station switching detection means of the mobile terminal detects that the radio base station connected to the mobile terminal itself has been switched;

a router switching detection step at which router switching detection means of the mobile terminal detects that the multicast router connected to the mobile terminal itself has been switched;

a third updating step at which, when the station switching detection means detects the switching of the radio base station but the router switching detection means does not detect the switching of the multicast router, establishment request transmission means of the mobile terminal transmits a path establishing request for requesting the data link layer switch to establish a path for distributing an information signal to the radio base station connected to the mobile terminal itself, at which withdrawal request transmission means of the mobile terminal successively transmits a withdrawal request for requesting the multicast router to withdraw from the multicast group to which the mobile terminal itself belongs, and at which the establishment request transmission means transmits the path establishing request; and

a fourth updating step at which, when the station switching detection means detects the switching of the radio base station and the router switching detection means detects the switching of the multicast router, the establishment request means transmits the path establishing request to ~~the new~~ a first multicast router which is the multicast router connected to the mobile terminal after the switching the multicast router, at which the withdrawal request transmission means successively transmits the withdrawal request to ~~the previous~~ a second multicast router which is the multicast router connected to the mobile terminal before the switching the multicast router, and at which the establishment request transmission means further transmits the path establishing request to the ~~previous~~ second multicast router thereafter.

10. (currently amended) A mobile communication method according to claim 9, further comprising:

a connection strength determination step at which connection strength determination means of the mobile terminal determines whether the strength of connection with the radio base station connected to the mobile terminal itself is equal to or higher than a predetermined threshold;

a router detection step at which router detection means of the mobile terminal detects the presence of the multicast routers connected to the radio base station and another radio base station adjacent to the radio base station;

a recording step at which recording means of the mobile terminal records information identifying the multicast router which has established a multicast distribution path with the establishment request transmission means;

a fifth updating step at which, in cases where the connection strength determination step determines that the strength of connection with the ~~connected~~ radio base station being connected is lower than the predetermined threshold when the router detection step detects the presence of a multicast router which is not recorded in the recording means, the transmission control means outputs the first instruction signal to the ~~detected~~ multicast router which has been detected and records information identifying the ~~detected~~ multicast router which has been detected in the recording means; and

a sixth updating step at which, in cases where the connection strength determination step determines that the strength of connection with the ~~connected~~ radio base station being connected has become equal to or higher than the predetermined threshold again after ~~the recording~~ the information identifying the multicast router which has been detected, the transmission control means outputs the second instruction signals to all multicast routers excluding the connected multicast router and deletes information identifying the multicast ~~routers~~ router to which the second instruction signal has been output from the recording means.